Description and operating instructions
INDUSTRIAL ETHERNET Modular Industrial Communication Equipment

MICE

Order No.

943 7..-001

The modular industrial communication equipment, MICE, is a modular network component.
It was developed particularly for use in an industrial environment.

The MICE described in this instructions consists of a switch and media modules that can be plugged into it. It allows you to construct switched ETHERNET networks that conform to the IEEE 802. and 802.3u standard using copper wires or optical fibers in a bus or ring topology.

TP/TX/FL/FX terminal devices or other TP/TX/FL/FX segments can be connected to the 10/100 Mbit/s ports of the media modules.

The TP/TX ports support autocrossing, autonegotiation and autopolarity.

The switch, that can be managed using SNMP and the Web interface, supports both ETHERNET 10 MBit/s and Fast ETHERNET 100 MBit/s.

The switches are mounted by simply snapping them onto a standard DIN rail.

The MICEs have one V.24 interface for external management.

In the„MICE Management Manual – INDUSTRIAL ETHERNET Modulare Industrial Equipment“ you find a detailled description of the MICE.

HiVision, the Hirschmann network management system, is the optimum management solution for this product. Your sales partner keeps information ready.

We have checked that the contents of the technical publication agree with the hardware and software described. However, it is not possible to rule out deviations completely, so we are unable to guarantee complete agreement. However, the details in the technical publication are checked regularly. Any corrections which prove necessary are contained in subsequent editions. We are grateful for suggestions for improvement.

We reserve the right to make technical modifications.

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Note

We would point out that the content of these operating instructions is not part of, nor is it intended to amend an earlier or existing agreement, permit or legal relationship. All obligations on Hirschmann arise from the respective purchasing agreement which also contains the full warranty conditions which have sole applicability. These contractual warranty conditions are neither extended nor restricted by comments in these operating instructions.

We would furthermore point out that for reasons of simplicity, these operating instructions cannot describe every conceivable problem associated with the use of this equipment. Should you require further information or should particular problems occur which are not treated in sufficient detail in the operating instructions, you can request the necessary information from your local Hirschmann sales partner or directly from the Hirschmann office (address: refer to chapter entitled „Notes on CE identification“).

Safety Instructions

This manual contains instructions which must be observed to ensure your own personal safety and to avoid
damage to devices and machinery. The instructions are highlighted with a warning triangle and are shown as
follows according to the degree of endangerment:

Danger!
means that death, serious injury or considerable damage to property **will** result if the appropriate safety measures are not taken.

Warning!
means that death, serious injury or considerable damage to property **can** result if the appropriate safety measures are not taken.

Caution!
means that light injury or damage to property can result if the appropriate safety measures are not taken.

Note: is an important piece of information about the product, how to use the product, or the relevant section of the documentation to which particular attention is to be drawn.

Certified usage

Please observe the following:

Warning
The device may only be employed for the purposes described in the catalog and technical description, and only in conjunction with external devices and components recommended or approved by Hirschmann. The product can only be operated correctly and safely if it is transported, stored, installed and assembled properly and correctly. Furthermore, it must be operated and serviced carefully.

Safety Guidelines Power Supply

☐ Switch the basic devices on only when the case is closed.

Warning!
The devices may only be connected to the supply voltage shown on the type plate.

The devices are designed for operation with a safety extra-low voltage.Thus, they may only be connected to the supply voltage connections and to the signal contact with PELV circuits or alternatively SELV circuits with the voltage restrictions in accordance with IEC/EN 60950.

☐ For the case where the module is operated with external power supply: Use only a safety extra-low voltage in accordance with IEC 950/EN 60 950/VDE 0805 to power the system.

☐ First of all you connect the protecting line, before you establish the further connections. When you remove connections, you disconnect the protecting line last.

☐ Relevant for North Amerika:
The subject unit is to be suppplied by a Class 2 power source complying with the requirements of the National Electrical Code, table 11(b). If power is redundant supplied (two individual power sources) the power sources together should comply with the requirements of the Na-tional Electrical Code, table 11 (b).

☐ Relevant for North Amerika:
Use 60/75°C copper(CU)wire only.

Safety Guidelines Shielding Ground

Note: The shielding ground of the connectable twisted pairs lines is connected to the front panel as a conductor.

☐ Beware of possible short circuits when connecting a cable section with conductive shielding braiding.

Safety Guidelines Housing

Warning!
Only technicians authorized by Hirschmann are permitted to open the housing.

Note: The lower covering panel of the MICE housing is grounded by the tophat rail and, as an option, by the separate ground screw.

☐ Make sure that the electrical installation meets local or nationally applicable safety regulations.

Warning!
The ventilation slits must not be covered so as to ensure free air circulation.

The distance to the ventilation slots of the housing has to be a minimum of 10 cm.

Never insert pointed objects (thin screwdrivers, wires, etc.) into the inside of the subrack! This especially applies to the area behind the socket connectors. Failure to observe this point may result in injuries caused by electric shocks.

Note: According to EN 60950 the device may only be operated in a fire protective housing.

Note: The housing has to be mounted in upright position.

Safety Guidelines Environment

Warning!
The device may only be operated in the listed ambient temperature range at the listed relative air humidity (non-condensing).

☐ The installation location is to be selected so as to ensure compliance with the climatic limits listed in the Technical Data.

Staff qualification requirements

Note: Qualified personnel, as understood in this manual and in the warning signs, are persons who are familiar with the setup, assembly, startup, and operation of this product and are appropriately qualified for their job. This includes, for example, those persons who have been:

– trained or directed or authorized to switch on and off, to ground and to label power circuits and devices or systems in accordance with current safety engineering standards

– trained or directed in the care and use of appropriate safety equipment in accordance with the current standards of safety engineering

– trained in providing first aid.

General Safety Instructions

☐ This device is electrically operated. Adhere strictly to the safety requirements relating to voltages applied to the device as described in the operating instructions!

⚠ **Warning!**
Failure to observe the information given in the warnings could result in serious injury and/or major damage.

Only personnel that have received appropriate training should operate this device or work in its immediate vicinity. The personnel must be fully familiar with all of the warnings and maintenance measures in these operating instructions.

Correct transport, storage, and assembly as well as careful operation and maintenance are essential in ensuring safe and reliable operation of this device.

☐ These products are only to be used in the manner indicated in this version of the "Description and Operating Instructions".

☐ Particular attention is to be paid to all warnings and items of information relating to safety.

⚠ **Warning!**
Any work that may have to be performed on the electrical installation should be performed by fully qualified technicians only.

Based specifications and standards:

The devices fulfil the following specifications and standards:
– EN 61000-6-2:1999 Generic standards – Immunity for industrial environments
– EN 55022:1998 – Information technology equipment – Radio disturbance characteristics
– EN 60950:1997 – Safety of Information Technology Equipment (ITE)
– EN 61131-2:1994 – Programmable Controllers
– CFR-47 Part 15:1997 – Code of Federal Regulations
– Germanischer Lloyd Guidelines for the Performance of Type Tests Part 1
– UL 508:1998 – Underwriters Laboratories Inc. Standard for Safety

CE Notes on CE identification

The devices comply with the regulations of the following European directive:

89/336/EEC
Council Directive on the harmonization of the legal regulations of member states on electromagnetic compatibility (amended by Directives 91/263/EEC, 92/31/EEC and 93/68/EEC).

The EU declaration of conformity is kept available for the responsible authorities in accordance with the above-mentioned EU directives at:

Hirschmann Electronics
GmbH & Co. KG
Automation and Network Solutions
Stuttgarter Straße 45-51
D-72654 Neckartenzlingen
Telephone ++49-7127-14-1538

The product can be used in the residential sphere (residential sphere, business and trade sphere and small companies) and in the industrial sphere.
– Interference immunity: EN 61000-6-2:1999
– Radio interference level: EN 55022:1998 Class A

⚠ **Warning!**
This is a Class A device. This equipment may cause radio interference if used in a residential area; in this case it is the operator´s responsibility to take appropriate measures.

The precondition for compliance with EMC limit values is strict adherence to the construction guidelines specified in this description and operating instructions.

FCC Note:

This equipment has been tested and found to comply with the limits for a Class A digital device, persuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

♻ **Recycling Note:**
After its use, this product has to be processed as electronic scrap and disposed of according to the prevailing waste disposal regulations of your community / district / country / state.

Fig. 1: Overview interfaces, display elements and controls of the MICE

1. Functional description

The ports of a MICE represent a terminal connection for the connected LAN segment. You can connect single devices or complete network segments.

1.1 FRAME SWITCHING FUNCTIONS

Store and Forward
All data received by the MICE from the system bus or at the ports are stored and checked for validity. Invalid and defective frames (> 1.522 byte or CRC error) as well as fragments (< 64 byte) are discarded. The MICE forwards the valid frames.

Multi address capability
A MICE learns all source addresses per port. Only packets with
– unknown addresses
– addresses learnt at this port
– a multi/broadcast address
in the destination address field are sent to this port.
A MICE learns up to 4,000 addresses. This becomes necessary if more than one terminal device is connected to one or more ports. In this way several independent subnetworks can be connected to a MICE.

Learnt addresses
A MICE monitors the age of the learned addresses. The MICE deletes address entries from the address table which exceed a certain age (30 seconds).
Note: Restarting deletes the learned address entries.

Priority
The MICE supports two priority queues (traffic classes complying with IEEE802.1D). The classification of received data packets to these classes is done by the priority of the data packet included in the VLAN tag.

Tagging (IEEE 802.1Q)
The IEEE 802.1 Q standard designates the VLAN tag to be included in a MAC data frame for the VLAN and prioritizing functions. The VLAN tag consists of 4 bytes. It is inserted between the source address field and the type field.

For data packets with VLAN tag the MICE analyses the 3 bit priority field of the VLAN tag. The MAC data frame is transmitted unchanged by the MICE.

1.2 SPECIFIC FUNCTIONS OF THE TP/TX INTERFACE

Link control
The MICE monitors the connected TP/TX line segments for short-circuit or interrupt using regular link test pulses in accordance with IEEE standard 802.3 10/100BASE-TP/TX. The MICE does not transmit any data to a TP/TX segment from which it does not receive a link test pulse.

Note: A non-occupied interface is assessed as a line interrupt. The TP/TX line to terminal equipment which is switched off is likewise assessed as a line interrupt as the de-energised bus coupler cannot transmit link test pulses.

Auto polarity exchange
If the receive line pair is incorrectly connected (RD+ and RD- switched) polarity is automatically reversed.

Autocrossing
If the autonegotiation function is active, the MICE detects the transmit and receive pairs (MDI, MDI-X). The MICE automatically configures its port for the correct transmit and receive pins. Consequently it does not matter whether you connect devices using a cross-over or straight cable.

1.3 SPECIFIC FUNCTIONS OF THE F/O INTERFACE

Link control
According to IEEE 802.3 standard 100BASE-FX a MICE monitors the attached F/O lines for open circuit conditions.

1.4 REDUNDANCY FUNCTIONS

Backbone as a ring (HIPER-Ring)
With the RM function (redundancy manager) of the MICE you can close a line structured RS1, RS2-.../..., MICE or MACH 3000 backbone to a redundant ring.
If one section fails the ring structure changes itself back into a line structure within 0.5 seconds in a ring with up to 50 switches.

1.5 SECURITY

Port security
A MICE protects every port from unauthorized access. The following functions are available for the security monitoring of every single port:
– Who has access to this port?
– Actions which result on an unauthorized access
– How to proceed in case of an access of an unknown user

1.6 FURTHER FUNCTIONS AND FEATURES

Diagnosis
In case of a reset the MICE runs a hardware self test. During operation an integrated watch dog (monitoring unit) monitors the function of the software.

Reset
The MICE will be reset by the following actions:
– management
– input voltages fall below a threshold
– watchdog
– faulty internal clock.

After a reset the following actions are carried through:
– self test
– initialization

1.7 DISPLAY ELEMENTS

After applying the operating voltage, the software starts and initializes itself. The MICE then performs a selftest. Various LEDs light up in the process. The process lasts approximately 30 seconds.

Device status
These LEDs provide information about statuses which affect the function of the entire MICE.

P – Power (green LED)
– lit: – internal supply voltage present
– not lit: – internal supply voltage is too low

P1 – Power 1 (green LED)
– lit: – supply voltage 1 present
– not lit: – supply voltage 1 is less than 18 V

P2 – Power 2 (green LED)
– lit: – supply voltage 2 present
– not lit: – supply voltage 2 is less than 18 V

FAULT – Failure (red LED)
– lit: – The indicator contact is open, i.e. it indicates an error.
– not lit: – The indicator contact is closed, i.e. it does not indicate an error.

RM – Redundancy Manager (green/yellow LED)
– lit green: – RM function active, redundant port not active
– lit yellow: – RM function active, redundant port active
– not lit: – RM function not active

Display status
Each media module has one LED per port. The meaning of these port status LEDs depends on the setting on the switch basic module. The display meaning can be set with the „SELECT“ button on the switch basic module.
☐ Press the button approximately 2 seconds to continue switching the meaning of the display. If the button is not pressed for approximately 20 seconds, the display status changes to "L/D.“

L/D – data, link status (green LED)
– lit green: – The port LEDs of the media modules display the connection status.

FDX – fullduplex (green LED)
– lit green: – The port LEDs of the media modules display the connection type, full or half duplex.

100 – 10/100 Mbit/s (green LED)
– lit green: – The port LEDs of the media modules indicate the transmission rate.

AUTONEG – autonegotiation (green LED)
– lit green: – The port LEDs of the media modules indicate the port configuration type.

RING PORT – HIPER-Ring port (green LED)
– lit green: – The port LEDs of the media modules indicate the HIPER-Ring assignment.

LED TEST – LED test (green LED)
– lit green: – The status, display status and port status LED test is active.
The status LED "RM“ blinks green/yellow.
The status LED "FAULT“ blinks red.
The display status LEDs blink green.
The port status LEDs of the media modules blink green/yellow.

AutoConfiguration Adapter ACA
Both lower unlabeled LEDs indicate ACA memory operations.
– blink: – Memory operation concerning the ACA.

Port Status
These LEDs display port-related information. Set the contents of the information with the button on the switch basic module.

1 to 4 – Data, Link status (green/yellow LED)
– not lit: – no valid link
– lit green: – valid link
– blinking green (1 single blink per period) – port is switched to standby (port 1)
– blinking green (3 blinks per period) – port is disabled
– flashes yellow:– receiving data

1 to 4 – FDX (green/yellow LED)
– lit green: – full duplex is active.
– not lit: – half duplex is active.

1 to 4 – 100 (green/yellow LED)
– lit green: – 100 Mbit/s is active.
– not lit: – 10 Mbit/s ist active.

1 to 4 – AUTONEG (green/yellow LED)
– lit green: – autonegotiation is active.
– not lit: – autonegotiation is not active.

1 to 4 – RING PORT (green/yellow LED)
– lit green: – this port is part of the HIPER-Ring.
– not lit: – this port is not part of the HIPER-Ring.

1 to 4 – LED TEST (green/yellow LED)
– blinks green/yellow:– LED Test is active.
– not lit: – LED defective.

1.8 CONTROLS

3-pin DIP switch (MICE)
With the 3-pin DIP switch in the covering panel of the switch basic module
– you can switch on or off the RM functionality (Redundancy Manager) with the **RM** switch. State of delivery: switch in position 0 (Off), i.e. RM function not active.
– You can select the port with the ring port switch for the HIPER-Ring.
In the delivery state (OFF position), ports 1 and 2 form the connection for the HIPER-Ring.
In the ON position, ports 1 and 5 form the connection for the HIPER-Ring. In the ON position, there is also a redundancy of the media module. The ON position offers the option of changing media within the HIPER-Ring.

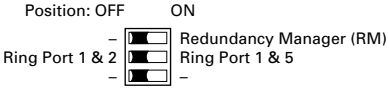

Fig. 2: 3-pin DIP switch

1.9 INTERFACES

10/100 MBit/s connection
10/100 Mbit ports (8-pin R45 sockets) allow terminal equipment or independent network segments complying with the standards IEEE 802.3 100BASE-TX / 10BASE-T to be connected. These ports support autonegotiation and the autopolarity function.

Factory settings: autonegotiation active (except for the HIPER ring port).

The socket housings are electrically connected to the lower panel of the module. The pin configuration complies with MDI-X.

– **Pin configuration** of the RJ45 socket:
– TD+: pin 3, TD-: pin 6
– RD+: pin 1, RD-: pin 2
– remaining pins: not used.

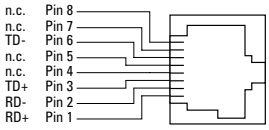

Fig. 3: Pin configuration of a TP/TX interface

10 Mbit/s F/O connection
10 MBit/s F/O ports (ST sockets) make it possible to connect terminal devices or independent network segments compliant with the IEEE 802.3 10BASE-FL standard. These ports support full and half duplex operation.
State of delivery: half duplex.

Note: 10 Mbit/s ports are not ring ports.

100 Mbit/s F/O connection
100 MBit/s F/O ports (MTRJ or DSC sockets) make it possible to connect terminal devices or independent network segments compliant with the IEEE 802.3 100BASE-FX standard. These ports support full and half duplex operation.
State of delivery: full duplex.

V.24 interface (external management)
A serial interface for local connection of an external management station (VT100 terminal or a PC with corresponding terminal emulation) is available via the RJ11 socket (V.24 interface). A link can thus be established with the User Interface UI.

VT100 terminal settings:
– Speed: 9,600 Baud
– Data: 8 bit
– Stopbit: 1 bit
– Handshake: off
– Parity: none

The V.24 interface baud rate can be configured to 9,600 or 19,200 baud. The factory default is 9,600 baud.

The socket casing is galvanically connected to the lower panel of the device. The signal lines are galvanically separated from the operating voltage (60 V isolation voltage) and the lower panel.

– **Pin configuration** of the V.24 interface:
– TX: Pin 3, RX: Pin 5
– CTS: Pin 1, RTS: Pin 6
– GND: Pin 4
– Pin 2: not used.

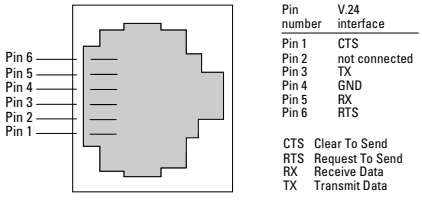

Fig. 5: Pin configuration of the V.24 interface

Note: In chapter 6 „Technical data“ you find the order number for the terminal access cable which is to be ordered separately.

6-pin terminal block
The supply voltage and the indicator contact are connected via a 6pin terminal block with screw locking mechanism.

Warning!
The MICE equipment is designed for operation with SELV. Only PELV circuits or alternatively SELV circuits with the voltage restrictions in accordance with IEC/EN 60950 may therefore be connected to the supply voltage connections and to the indicator contact.

– **Voltage supply**: Redundant voltage supplies are supported. Both inputs are decoupled. There is no load distribution. With redundant supply, the power pack supplies the MICE only with the higher output voltage. The supply voltage is electrically isolated from the housing.

– **Indicator contact:**
The indicator contact is used to supervise the functions of the MICE and thus facilitates remote diagnosis.
Contact interrupt indicates the following by means of a potential-free indicator contact (relay contact, closed circuit):
– the failure of at least one of the two supply voltages.
– a permanent fault in the MICE (internal 3,3 V DC voltage, supply voltage 1 or 2 < 18 V, ...).
– the faulty link status of at least one port. The indication of the link state on the MICE can be masked on a port-by-port basis using the management software. State of delivery: there is no link test.
– self test error

In addition the MICE in RM mode can indicate the following states:
– Ring monitoring is not possible, e. g. during software initializing.

Note: In the case of the voltage supply being routed without redundancy, the MICE indicates the failure of a supply voltage. You can prevent this message by feeding in the supply voltage through both inputs.

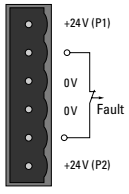

Fig. 9: Pin configuration of 6pin terminal block

Ground connection
The lower covering panel of the MICE housing is grounded by the tophat rail and, as an option, by the separate ground screw.

2. Configuration

2.1 LINE STRUCTURE

The MICE enables backbones in line structures to be built up. Cascading takes place via the ring ports.

2.2 REDUNDANT RING STRUCTURE

With the RM function (redundancy manager) of the MICE or with an MACH 3000 can close the two ends of a line structured backbone to form a redundant ring.

The MICE is integrated into the ring via the ring ports (ports 1&2 or 1&5). Within a redundant ring any mixture of MICE, MACH 3000, RS1 and RS2-.../... is possible. If one section fails the recovery time is less than 0.5 seconds for a ring containing up to 50 MICE/MACH 3000/RS1/RS2-.../... being cascaded and the ring structure is changed back into a line structure.

Note: The „HIPER-Ring" function requires the following settings for the ring ports: 100 Mbit/s, full duplex and autonegotiation off (= state of delivery).

Note: Activate the RM function of a MICE or a MACH 3000.

3. Assembly, startup procedure and dismantling

3.1 UNPACKING, CHECKING

☐ Check whether the package was delivered complete (see scope of delivery).
☐ Check the individual parts for transport damage.

⚠ **Warning!**
Use only undamaged parts!

3.2 ASSEMBLY

The equipment is delivered in a ready-to-operate condition. Media modules can be assembled and disassembled during running operation. The following procedure is appropriate for assembly:

☐ To fasten a media module, first remove the protective cap over the plug.
☐ Plug the media module onto the plug. Fit the media modules one after the other from the left to the right.
☐ Tighten the 4 screws on the corners of the media module.
☐ Check whether the switch pre-setting suits your requirements (see chap. 1.8).
☐ Pull the terminal block off the MICE and wire up the supply voltage and indicator lines.
☐ Fit the MICE on a 35 mm standard bar to DIN EN 60 175.
☐ Attach the upper snap-on slide bar of the MICE to the standard bar and press it down until it locks in position.
☐ Fit the signal lines.

Notes:

– The lower covering panel of the housing is grounded by the tophat rail and, as an option, by using the ground screw.

– Do not open the housing.

– The shielding ground of the twisted pair lines which can be connected is electrically connected to the front panel.

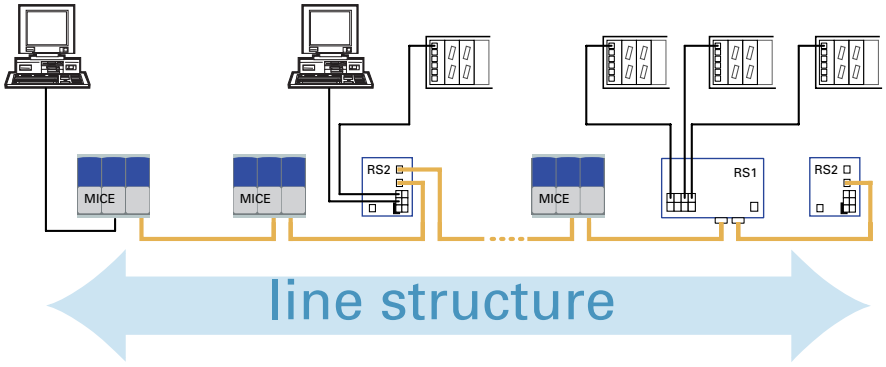

Abb. 6: Linienstruktur

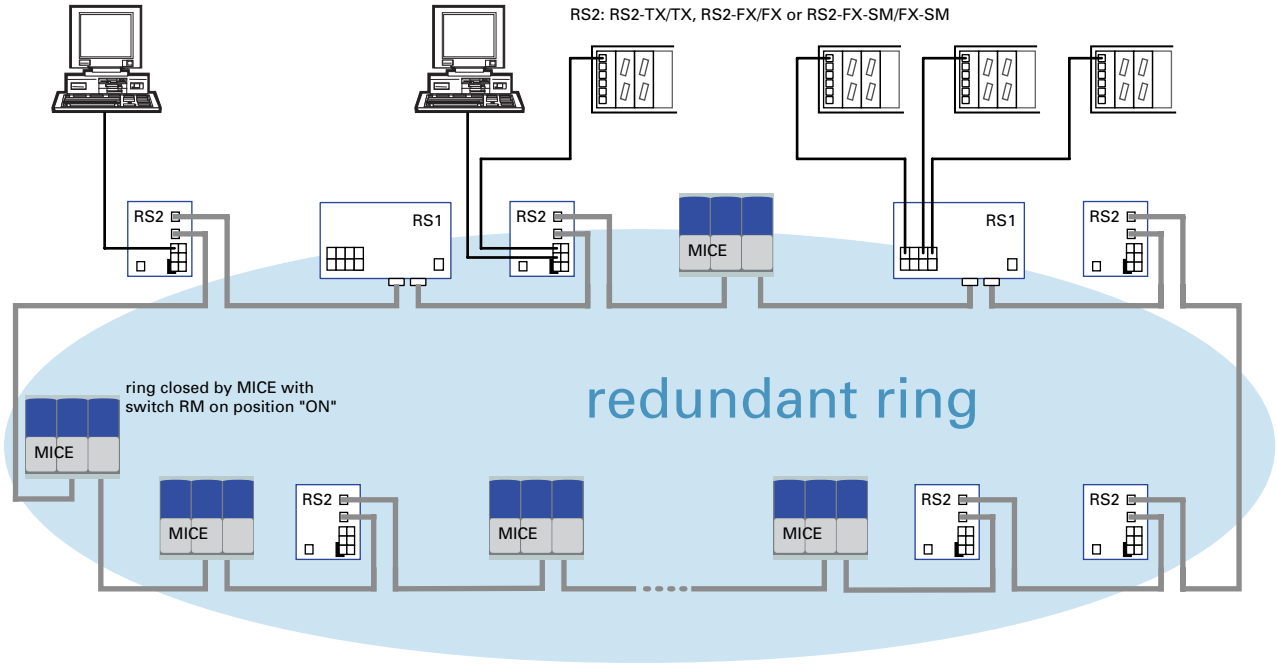

Abb. 7: Redundante Ringstruktur

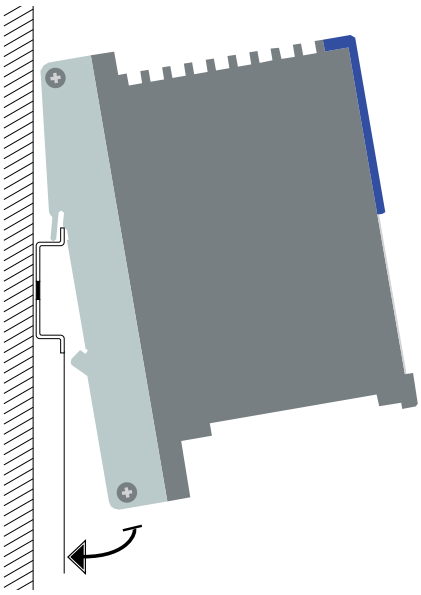

Fig. 8: Assembling the MICE

3.3 ERWEITERUNGSMODUL MB3 - 2T

The MB3 - 2T expansion module can be installed while in runningoperation.

☐ On the right side of the MS3124 - 4 switch basic module, loosen the screw at the top and at the bottom (1-3 revolutions).

☐ Remove the side cover.

☐ If you have not yet done so, mount the MS3124 - 4 switch basic module onto the top-hat rail.

☐ Slide the MB3 - 2T expansion module on the top-hat rail toward the MS3124 - 4 switch basic module until the modules plug into each other.

☐ On the MS3124 - 4 switch basic module, tighten the screws at the top and at the bottom.

3.3 STARTUP PROCEDURE

You start up the MICE by connecting the supply voltage via the 6-pin terminal block. Lock the terminal block with the locking screw at the side.

3.4 BASIC SETTINGS

On the first installation of the MICE you have to enter the IP addresse(s). The MICE provides 4 possibilities to configure the IP addresses (refer to MICE manual):

– Configuration via BOOTP (bootstrap protocol)
– Configuration via DHCP (dynamic host configuration protocol)
– Input via the V.24 interface.
– AutoConfiguration Adapter.

3.5 DISMANTLING

☐ In order to remove the MICE from the tophat rail, press the MICE downward and pull it out from under the tophat rail.

4. Management

4.1 INTODUCTION

The MICE supports SNMP and Web-based management and thus offers a extensive diagnosis and configuration functions for an easy startup procedure as well as extensive network- and device information. The MICE supports the TCP/IP protocol family. You will find detailed descriptions regarding the SNMP management, functionality of the User Interface, web interface, system monitors, software update and Management Information Base MIB in the MICE manual.

4.2 SNMP MANAGEMENT

– Factory settings: All parameters which can be adjusted via management are pre-set to default values. You will find detailed descriptions in the MICE manual.

4.3 USER INTERFACE

The User Interface (UI) can be used in addition to the web interface.

On the first installation of the MICE you have to enter IP addresse(s). If you do not have a VT100 terminal near the installation place at your disposal, you can enter the IP addresses before the final installation. For that you need a VT100 terminal or a corresponding emulation (e.g. MS windows terminal).
The User Interface starts after pressing any key.
– State of delivery: password „private“

– System parameters

Among others various addresses can be entered in the window presented on the screen (IP address, netmask, gateway IP address) and the IP configuration mode can be selected.

4.4 WEB-BASED INTERFACE

In order to open the Web-based interface you need a Web browser (program which enables to read hypertext), for example the Netscape Navigator/Communicator from version 4.x on or the Microsoft Internet Explorer from version 5 on.

Note: The Web-based interface uses the plugin "Java runtime environment version 1.3". If this is not installed on your computer, an installation via the internet is started automatically on the first start of the Web-based interface. This installation takes a lot of time. For Windows NT users: Because of that stop the installation. Install the plugin from the enclosed CDROM. For that start the program file j2re1_3_0-win-i.exe in the Java table on the CDROM.

Access to the web interface is protected by a password. If you do not enter a password, only read access to the MICE is possible.
– Factory setting: password „private“

5. Further support

In the event of technical queries, please talk to the Hirschmann contract partner responsible for looking after your account or directly to the Hirschmann office. You can find the addresses of our contract partners – on the Internet (http://www.hirschmann.de).

Our support line is also at your disposal: Tel. +49(7127) 14-1538 (Fax -1542)

Answers to Frequently Asked Questions can be found on the Hirschmann internet site

www.hirschmann.de

The FAQs are located under „Service“ in the Automation and Network Solutions section.

6. Technical data

General data

Operating voltage	24 VDC, -25% +33% safety extra-low voltage (SELV) (redundant inputs decoupled)	
Buffer time	min. 10 ms at 24 VDC	
Potential difference between input voltage and housing	Potential difference to input voltage, +24 VDC: 32 VDC Potential difference to input voltage, ground: -32 VDC	
Power consumption		
MS2108 - 2	8.0 W	
MS3124 - 4	11.0 W	
MM2 - 2FXM2	3.4 W	
MM2 - 2FXS2	3.4 W	
MM2 - 2FXM3/2TX1	3.4 W	
MM2 - 4FXM3	7.0 W	
MM2 - 4TX1	0.8 W	
MM2 - 2FLM4	2.6 W	
MM3 - 4FLM4	5.0 W	
MM3 - 2FXM2/2TX1	3.4 W	
MM3 - 2FXS2/2TX1	3.4 W	
MM3 - 1FXL2/3TX1	3.4 W	
MM3 - 4FXM2	7.0 W	
MB3 - 2T	0 W	
Overload current protection at input	non-changeable fuse	
Dimensions W x H x D	120 mm x 134 mm x 99 mm	
MS2108 - 2	120 mm x 134 mm x 99 mm	4.7 in x 5.3 in x 3.9 in
MS3124 - 4	275 mm x 134 mm x 140 mm	10.8 in x 5.3 in x 5.5 in
Weight		
MS2108 - 2	1 kg	2.2 lb
MS3124 - 4	1,9 kg	4.2 lb
Ambient temperature	0 ºC to + 55 ºC, 32 °F to 131 °F (with MM2 - 4FXM3: 0 ºC to + 50 ºC, 32 °F to 122 °F)	
Storage temperature	- 20 ºC to + 80 ºC	-4 °F to 176 °F
Humidity	10% to 95% (non condensing)	
Atmospheric pressure	795 hPa minimum	
Laser protection	Class 1 conforming to EN 60825	
Protection type	IP 20	
Radiated emission	CFR-47 Part 15 Class A, Germanischer Lloyd Guidelines for the Performance of Type Tests Part 1 EN 55022 Class A Warning! This is a Class A device. This equipment may cause radio interference if used in a residential area. In this case the operator may be required to take appropriate measures.	
Interference proof		
Discharge of static electricity		
Contact discharge	EN 61000-4-2 Test level 3	
Air discharge	EN 61000-4-2 Test level 3	
Electromagnetic fields	EN 61000-4-3 Test level 3	
Fast transients	EN 61000-4-4 Test level 3	
Surge voltage symmetrical	EN 61000-4-5 Test level 2	
Surge voltage asymmetrical	EN 61000-4-5 Test level 3	
Cable-based RF faults	EN 61000-4-6 Test level 3	
Stability		
Vibration	IEC 60068-2-6 Test FC, testing level in line with IEC 61131-2 E2 CDV and Germanischer Lloyd Guidelines for the Performance of Type Tests Part 1	
Shock	IEC 60068-2-27 Test Ea, testing level in line with IEC 61131-2 E2 CDV	

Network size

TP port 100BASE-T/TX		
Length of a twisted pair segment	100 m (328 ft) typ.	
F/O port 10BASE-FL		
System attenuation		
50/125 µm fiber (multimode)	11 dB (-FLM4)	
62,5/125 µm fiber (multimode)	14 dB (-FLM4)	
Wave length	850 nm	
F/O line length 10 BASE-FL (example)		
50/125 µm fiber (multimode)	2,6000 m (8,530 ft) maximum (-FLM4)	(data of fiber: 3 dB/km, 400 MHz∗km)
62,5/125 µm fiber (multimode)	3,600 m (11,811 ft) maximum (-FLM4)	(data of fiber: 3.2 dB/km, 200 MHz∗km)
F/O port 100BASE-FX		
System attenuation		
50/125 µm fiber (multimode)	8 dB (-FXM2; -FXM3)	
62,5/125 µm fiber (multimode)	11 dB (-FXM2; -FXM3)	
10/125 µm fiber (singlemode)	16 dB (-FXS2)	
Wave length	1300 nm (-FXM2; -FXM3; -FXS2)	
10/125 µm fiber (singlemode)	7-29 dB (-FXL2)	
Wave length	1550 nm (-FXL2)	
F/O line length (example)		
50/125 µm fiber (multimode)	5 km (16,400 ft) maximum (-FXM2; -FXM3)	(data of fiber: 1 dB/km, 800 MHz∗km)
62,5/125 µm fiber (multimode)	4 km (13,120 ft) maximum (-FXM2; -FXM3)	(data of fiber: 1 dB/km, 500 MHz∗km)
10/125 µm fiber (singlemode)	30 km (98,420 ft) maximum (-FXS2)	(data of fiber: 0,4 dB/km)
10/125 µm fiber (singlemode)	24-100 km (78,740-328,083 ft), (-FXL2)	(data of fiber: 1550 nm, 0,3 dB/km)

Interfaces

MS2108 - 2	V.24 port	external management
	Signaling relay	1 A, 24 V maximum
	Power supply	
MM2 - 2FLM4	2 FL ports	(ST sockets, multimode, 10 MBit/s)
MM2 - 4TX1	4 TP/TX ports	(RJ45 sockets,10/100 MBit/s)
MM2 - 4FXM3	4 FX ports	(MTRJ sockets, multimode, 100 MBit/s)
MM2 - 2FXM3 / 2TX1	2 FX ports	(MTRJ sockets, multimode, 100 MBit/s) and
	2 TX ports	(RJ45 sockets, 10/100 MBit/s)
MM2 - 2FXM2	2 FX ports	(DSC sockets, multimode, 100 MBit/s)
MM2 - 2FXS2	2 FX ports	(DSC sockets, singlemode, 100 MBit/s)
MS3124 - 4	V.24 port	external management
	Signaling relay	1 A, 24 V maximum
	Power supply	
MM3 - 4FLM4	4 FL ports	(ST sockets, multimode, 10 MBit/s)
MM3 - 2FXM2 / 2TX1	2 FX ports	(DSC sockets, multimode, 100 MBit/s) and
	2 TP/TX ports	(RJ45 sockets,10/100 MBit/s)
MM3 - 2FXS2 / 2TX1	2 FX ports	(DSC sockets, singlemode, 100 MBit/s) und
	2 TX ports	(RJ45 sockets, 10/100 MBit/s)
MM3 - 1FXL2 / 3TX1	1 FX port	(DSC sockets, singlemode Long Haul, 100 MBit/s) und
	3 TX ports	(RJ45 sockets, 10/100 MBit/s)
MM3 - 4FXM2	4 FX ports	(DSC sockets, multimode, 100 MBit/s)

Displays

Device status	1 x green LED	**P** – Power, internal supply voltage present
	1 x green LED	**P1** – Power 1, internal supply voltage 1 present
	1 x green LED	**P2** – Power 2, internal supply voltage 2 present
	1 x red LED	**FAULT** – Failure, the indicator contact is open and indicates an error
	1 x green/yellow LED	**RM** – Redundancy Manager
Display status	1 x green LED	**L/D** – Data/Link status
	1 x green LED	**FDX** – Full duplex
	1 x green LED	**100** – 10/100 Mbit/s
	1 x green LED	**AUTONEG** – Autonegotiation
	1 x green LED	**RING PORT** – HIPER-Ring port
	1 x green LED	**LED TEST** – LED test
	2 x green LED	unlabeled – ACA display
Port status	4 x green/yellow LED	**1 to 4** – The meaning depends on the setting of the display status.

Controls

3-pole DIP switch	**RM** – activate redundancy manager functionality **Ring Port** – defining HIPER-Ring ports

Scope of delivery

MICE MS2108 - 2 incl.
- Terminal block for power supply and indicator contact
- Labels, description and operating instructions
- MICE manual on CD-ROM

Order number

MS2108 - 2	943 717-001
MM2 - 2FLM4	943 734-001
MM2 - 4TX1	943 722-001
MM2 - 4FXM3	943 721-001
MM2 - 2FXM3 / 2TX1	943 720-001
MM2 - 2FXM2	943 718-001
MM2 - 2FXS2	943 719-001
MS3124 - 4	943 746-001
MM3 - 4FLM4	943 760-001
MM3 - 2FXM2/2TX1	943 761-001
MM3 - 2FXS2/2TX1	943 762-001
MM3 - 1FXL3/3TX1	943 763-001
MM3 - 4FXM2	943 764-001
MB3 - 2T	943 733-001

Accessories

Manual	
Basics INDUSTRIAL ETHERNET and TCP/IP	280 720-834
AutoConfigurationAdapter ACA 11	943 751-001
Terminal access cable	943 301-001
Rail Power Supply RPS 60	943 662-001
Rail Power Supply RPS 120	943 662-011
Network Management Software HiVision	943 471-100

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